



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF DRINKING WATER AND MUNICIPAL ASSISTANCE

INSTRUCTIONS FOR FORM DEQ(E) 6517 MONITORING PLAN FOR COMMUNITY WATER SUPPLIES – DISINFECTANTS AND DISINFECTION BYPRODUCTS (DDBP)

Page 1 General Information: Self-explanatory.

Page 2 Measure Chlorine Residual: Self-explanatory.

Monitor Total Trihalomethanes and Haloacetic Acids:

TTHM and HAA5 Sample Sites and Monitoring Frequency

Column	Explanation
Site Code	Number the DBP sites, DBP1, DBP2, etc. (required format) <ul style="list-style-type: none">• See attached Table 2 to determine the required number of sample sites based on population and supply type.• Each Site Code is unique to a Sample Site Address. If a site becomes unavailable, the new site must have its own Site Code – it cannot use the Site Code of the old site. Contact the DEQ for a new Site Code.
Sample Site Address	Enter address of each sampling site. <ul style="list-style-type: none">• Select sites ONLY in consultation with the DEQ.• List sites in descending order from highest TTHM and HAA5 concentrations, as in the IDSE Report. If an IDSE Report was not done, then consult with the DEQ to select sites that are expected to yield the highest DBP concentrations using attached Guidance on Site Selection.
Rational for Selection	State why each site was selected, e.g. <i>highest TTHM site</i> or <i>next highest HAA5 site</i> .
ROUTINE Monitoring	<p>Sample Every: Check monitoring frequency. See attached Table 2 under <i>Routine Standard</i> column and under <i>Every</i> column. Consecutive supplies use <i>Routine for CS only</i> column.</p> <p>TTHM, HAA5: Check which contaminant(s) to monitor. See the attached Table 2 under <i>Routine Standard</i> column. See <i>Set</i> column to determine whether Dual or No Dual set is required. Consecutive supplies use <i>Routine for CS only</i> column.</p>
REDUCED Monitoring	<p>Do not complete this column unless/until the DEQ determines criteria are met for reduced monitoring based on routine monitoring results. Check the monitoring frequency and which contaminant(s) to monitor for at each site ONLY after consultation with the DEQ.</p> <p>Sample Every: Check monitoring frequency. See attached Table 2 under <i>Reduced Standard</i> column and under <i>Every</i> column. Consecutive supplies use <i>Reduced for CS only</i> column.</p> <p>TTHM, HAA5: Check which contaminant(s) to monitor. See the attached Table 2 under <i>Reduced Standard</i> column. See <i>Set</i> column to determine whether Dual or No Dual set is required. Consecutive supplies use <i>Reduced for CS only</i> column.</p>

Peak historic month: Self-explanatory.

When monitoring: Self-explanatory.

Monitor Bromate: Self-explanatory.

Schematic: Self-explanatory.

Page 3 Self-explanatory.

Page 5 Control of Disinfection Byproduct Precursors: Applicable only to water supplies that treat surface water or groundwater under the influence of surface water.

Applicability: Subpart H supplies using conventional filtration must monitor for total organic carbon (TOC). All Subpart H supplies (even those using another filtration method) cannot reduce DBP monitoring unless the source water TOC is less than 4 mg/L, regardless of filtration used. Therefore, non-conventional filtration Subpart H supplies should check the second box (a method other than conventional filtration) and monitor the source water for TOC.

Sample Sites: Check the box to acknowledge that samples are taken at the same time. Describe the specific sample sites so a water operator can identify the location in the plant.

End of Form Instructions

List of Acronyms and Definitions

<, <=, >	less than, less than or equal to, greater than
>>>	See next column
10k, 1M	10,000 and similarly throughout, 1 million
40/30	0.040 mg/L for TTHM and 0.030 mg/L for HAA5
60/45	0.060 mg/L for TTHM and 0.045 mg/L for HAA5
80/60	0.080 mg/L for TTHM and 0.060 mg/L for HAA5
CS	Consecutive Supply – a supply that receives water from or delivers water to another community water supply
DBP	Disinfection Byproducts TTHM and HAA5
Dual	A sample set of one TTHM and one HAA5
HAA5	Haloacetic Acids
LRAA	Locational running annual average
MCL	Maximum contaminant level
mg/L	milligrams per liter (mg/L)
No Dual	Supplies may monitor TTHMs at the site of highest TTHM concentration and HAA5 at the site of highest HAA5 concentration (instead of dual sample sets at both sites). If the highest TTHM and HAA5 concentrations occur at the same location, sampling at one location for both TTHM and HAA5 satisfies the requirement for 2 locations.
RAA	Running annual average
Rule 719k	Administrative Rule R 325.10719k under the Safe Drinking Water Act, 1976 PA 399
Stage 1	Stage 1 Disinfectants and Disinfection Byproducts Rule
Stage 2	Stage 2 Disinfectants and Disinfection Byproducts Rule
Sub H	Subpart H supplies – supplies serving surface water or groundwater under the direct influence of surface water
TOC	Total organic carbon
TTHM	Total Trihalomethanes
VSS	Very small system (fewer than 500 people)
Waiver	Waived from conducting the Initial Distribution System Evaluation for a 2 year period prior to Stage 2 DDBPR compliance monitoring.

Guidance on Site Selection

What makes a good TTHM site?

TTHM formation is strongly influenced by residence time. In addition, TTHM formation generally increases with increasing pH. TTHM sites should not be located at dead ends with no users. The sampling should be representative of water that is being consumed, not stagnant water.

- Areas with historically high TTHM levels.
- Storage tanks – down gradient of storage facilities, which have increased residence time.
- Low flow areas – sparsely populated areas with low flow.
- Geographic dead ends – areas that are physically located at the end of a water main or group of water mains without looping back to the main portion of the distribution system. However, do not sample stagnant water after the last customer. The purpose is to sample water that customers are consuming.
- Hydraulic dead ends and mixing zones – areas in which there is little movement of water. After booster chlorination – where formation will have increased due to more available disinfectant.
- Low or no residual (i.e., relative to initial disinfectant levels) – likely advanced residence time.
- Low water use in general – lightly developed areas where water is allowed to age.

What makes a good HAA5 site?

Different systems may find high HAA5 sites in locations with different characteristics. HAA5 formation and decomposition seems to follow a pattern that is different from that of TTHM in the distribution system. While TTHM concentrations are generally highest at the points in the system with the longest residence times, research suggests that HAA5 seem to form and then decompose. The consumption of HAA5 by microorganisms is known as biodegradation, which is more likely to occur when disinfectant residual levels are low or non-existent. Therefore, a high HAA5 site will not necessarily be the site with the longest residence time, and may even be at a site with shorter residence time.

- Areas with historically high HAA5 levels.
- Low but detectable residual (i.e., relative to initial levels) – likely advanced residence time but not sites likely to have biofilm.
- After booster chlorination – where formation will have increased due to more available disinfectant and where any biodegradation will be halted.
- Storage tanks – increased residence time.
- Dead ends – low flows. However do not sample stagnant water after the last customer. The purpose is to sample water that customers are consuming.
- Hydraulic dead ends and hydraulic mixing zones.

Q&A for DEQ Staff to Determine Monitoring Requirements

Do supplies begin Stage 2 monitoring under routine or reduced requirements? See attached Table 1.

What are the routine and reduced monitoring requirements? See attached Table 2.

What are the requirements after the first year of monitoring and thereafter? See attached Table 3.

Monitoring Under Stage 2 DDBPR

Table 1 Does a supply begin Stage 2 monitoring under routine or reduced requirements?

If supply ...	and ...	then the supply begins Stage 2 monitoring using proposed Stage 2 sites with the highest TTHM/HAA5 concentrations according to ...
Received 40/30 or VSS waiver <u>and</u> LRAA at Stage 1 sites are ≤ 40 <u>and</u> 30	All Stage 2 sites were also Stage 1 sites	Reduced
Does not meet above criteria	Stage 1 RAA is < 80 <u>and</u> 60 or Has no Stage 1 data and conducted IDSE	Routine
Is on increased monitoring under Stage 1 due to RAA > 80 <u>or</u> 60		Routine Standard column, collecting dual sets every 3rd month until supply qualifies for routine monitoring under Rule 719k(3)
Has no TTHM/HAA5 results (recently began disinfecting or is a new system)		Routine Standard using sites expected to be highest TTHM and HAA5 sites

Table 2 What are the routine and reduced monitoring requirements? Consecutive supplies use CS columns.

Supply Type	Population	Routine Standard			Routine for CS only			Reduced Standard			Reduced for CS only		
		Every	Set	Sites	Every	Set	Sites	Every	Set	Sites	Every	Set	Sites
Sub H	< 500	Year	No Dual*	2	Year	No Dual*	2	Year	No Dual*	2	Year	No Dual*	2
	500 to < 3300	3rd month	No Dual*	2	3rd Month	No Dual*	2	Year	No Dual*	2	Year	No Dual*	2
	3300 to $< 10k$	3rd Month	Dual	2	3rd Month	No Dual*	2	Year	Dual	2	Year	No Dual*	2
	10k to $< 50k$	3rd Month	Dual	4	3rd Month	Dual	2	3rd Month	Dual	2	3rd Month	No Dual*	2
	50k to $< 250k$	3rd Month	Dual	8	3rd Month	Dual	4	3rd Month	Dual	4	3rd Month	Dual	2
	250k to $< 1M$	3rd Month	Dual	12	3rd Month	Dual	6	3rd Month	Dual	6	3rd Month	Dual	3
Ground water	< 500	Year	No Dual*	2	Year	No Dual*	2	3rd Year	No Dual*	2	3rd Year	No Dual*	2
	500 to $< 10k$	Year	Dual	2	Year	No Dual*	2	Year	No Dual*	2	Year	No Dual*	2
	10k to $< 100k$	3rd Month	Dual	4	3rd Month	Dual	2	Year	Dual	2	Year	Dual	2
	100k to $< 500k$	3rd Month	Dual	6	3rd Month	Dual	3	3rd Month	Dual	2	3rd Month	Dual	2

* No dual: Supplies may monitor TTHMs at the site with the highest TTHM result and HAA5 at the site with the highest HAA5 result (instead of dual sample sets at both sites). If the highest TTHM and HAA5 results occur at the same site, sampling at 1 site for both TTHM and HAA5 satisfies the requirement for 2 sites.

Table 3 What are the requirements after the first year of monitoring and thereafter?

Currently monitoring according to ...	and the latest results indicate >>>	Each LRAA ≤ 40 <u>and</u> 30 then monitor according to...	Highest LRAA > 40 <u>or</u> 30 but ≤ 60 <u>and</u> 45 and		Highest LRAA > 60 <u>or</u> 45 but ≤ 80 <u>and</u> 60 and currently monitoring <u>at any frequency</u> then monitor according to...	Highest sample result > 80 <u>or</u> 60 and currently monitoring <u>less frequently than quarterly</u> then monitor according to...	Highest LRAA > 80 <u>or</u> 60 currently monitoring <u>quarterly</u> then monitor according to...
			currently monitoring <u>less frequently than quarterly</u> then monitor according to...	currently monitoring <u>quarterly</u> then monitor according to...			
Reduced		Reduced*	Reduced*	Routine	Routine	Collect dual sample sets at routine sites for 4 consecutive quarters to determine compliance with the MCL.	MCL violation! Post Tier 2 PN. Collect dual sample sets at <u>Routine Standard</u> sites every 3rd month.
Routine		Reduced*	Routine	Routine	Routine		

* Source water TOC RAA must be ≤ 4.0 mg/L at the Subpart H plant in order to reduce DBP monitoring.